CLAIMS

What is claimed is:

1. An on-chip transformer balun comprises:

primary winding having at least one primary turn, wherein the at least one primary turn is substantially symmetrical, and wherein the primary winding is on at least one dielectric layer; and

secondary winding having at least one secondary turn, wherein the at least one secondary turn is substantially symmetrical, and wherein the secondary winding is on at least one other dielectric layer and is magnetically coupled to the primary winding.

2. The on-chip transformer balun of claim 1, wherein the at least one primary turn further comprises:

a plurality of turns on a first one of the at least one dielectric layer; and

a plurality of metal bridges on a second one of the at least one dielectric layer, wherein the plurality of metal bridges are operably connected to the plurality of turns to provide the primary winding.

3. The on-chip transformer balun of claim 1, wherein the at least one secondary turn further comprises:

a plurality of turns on a first one of the at least one other dielectric layer; and

a plurality of metal bridges on a second one of the at least one other dielectric layer, wherein the plurality of metal bridges are operably connected to the plurality of turns to provide the secondary winding.

4. The on-chip transformer balun of claim 1 further comprises:

the primary winding including an interwoven spiral-type primary inductor; and

the secondary winding including an interwoven spiral-type secondary inductor that is substantially symmetrical to the primary winding.

5. The on-chip transformer balun of claim 4 further comprises:

the interwoven spiral-type primary inductor including a first number of multiple turns; and

the interwoven spiral-type secondary inductor including a second number of multiple turns.

6. The on-chip transformer balun of claim 1, wherein the secondary winding further comprises:

a center tap operably connected to ground to provide a differential signal at end ports of the secondary winding.

7. The on-chip transformer balun of claim 1, wherein the at least one primary turn further comprises:

at least one turn on a first one of the at least one dielectric layer;

at least one other turn on a second one of the at least one dielectric layer; and

a plurality of vias operably connecting the at least one turn on the first one of the at least one dielectric layer in parallel to the at least one other turn on the second one of the at least one dielectric layer to provide the primary winding.

8. The on-chip transformer balun of claim 1, wherein the at least one secondary turn further comprises:

at least one turn on a first one of the at least one other dielectric layer;

at least one other turn on a second one of the at least one other dielectric layer; and

a plurality of vias operably connecting the at least one turn on the first one of the at least one other dielectric layer in parallel to the at least one other turn on the second one of the at least one other dielectric layer to provide the secondary winding.

9. The on-chip transformer balun of claim 1 further comprises:

a substrate, wherein the at least one dielectric layer of the primary winding is on the substrate, wherein the at least one other dielectric layer of the secondary winding is on the substrate such that the primary winding is magnetically and capacitively coupled to the secondary winding.

10. A method of manufacturing an on-chip transformer balun, the method comprises:

creating, on a substrate, a primary winding having at least one primary turn, wherein the at least one primary turn is substantially symmetrical, and wherein the primary winding is on at least one dielectric layer; and

creating, on the substrate, a secondary winding having at least one secondary turn, wherein the at least one secondary turn is substantially symmetrical, and wherein the secondary winding is on at least one other dielectric layer and is magnetically coupled to the primary winding.

11. The method of claim 10, wherein the creating of the primary winding further comprises:

creating a plurality of turns on a first one of the at least one dielectric layer;

creating a plurality of metal bridges on a second one of the at least one dielectric layer; and

operably connecting the plurality of metal bridges to the plurality of turns to provide the primary winding.

12. The method of claim 10, wherein the creating of the secondary winding further comprises:

creating a plurality of turns on a first one of the at least one other dielectric layer;

creating a plurality of metal bridges on a second one of the at least one other dielectric layer; and

operably connecting the plurality of metal bridges to the plurality of turns to provide the secondary winding.

13. The method of claim 10 further comprises:

creating the primary winding to include an interwoven spiral-type primary inductor; and

creating the secondary winding to include an interwoven spiral-type secondary inductor that is substantially symmetrical to the primary winding.

14. The method of claim 13 further comprises:

creating the interwoven spiral-type primary inductor to include a first number of multiple turns; and

creating the interwoven spiral-type secondary inductor to include a second number of multiple turns.

15. The method of claim 10, wherein the creating of the secondary winding further comprises:

connecting a center tap of the secondary winding to ground to provide a differential signal at end ports of the secondary winding.

16. The method of claim 10, wherein the creating of the primary winding further comprises:

creating at least one turn on a first one of the at least one dielectric layer;

creating at least one other turn on a second one of the at least one dielectric layer;

creating a plurality of vias; and

operably connecting the at least one turn on the first one of the at least one dielectric layer in parallel to the at least one other turn on the second one of the at least one dielectric layer using the plurality of vias to provide the primary winding.

17. The method of claim 10, wherein the creating of the secondary winding further comprises:

creating at least one turn on a first one of the at least one other dielectric layer;

creating at least one other turn on a second one of the at least one other dielectric layer;

creating a plurality of vias; and

operably connecting the at least one turn on the first one of the at least one other dielectric layer in parallel to the at least one other turn on the second one of the at least one other dielectric layer using the plurality of vias to provide the secondary winding.

18. An integrated radio comprises:

receiver section operably coupled to convert an inbound radio frequency (RF) signal into an inbound intermediate frequency signal;

transmitter section operably coupled to convert an outbound intermediate frequency signal into an outbound radio frequency signal (RF); and

transformer balun operably coupled to receive the inbound RF signal from an antenna and to provide the outbound RF signal to the antenna, wherein the transformer balun includes:

primary winding having at least one primary turn, wherein the at least one primary turn is substantially symmetrical, and wherein the primary winding is on at least one dielectric layer; and

secondary winding having at least one secondary turn, wherein the at least one secondary turn is substantially symmetrical, and wherein the secondary winding is on at least one other dielectric layer and is magnetically coupled to the primary winding.

19. The integrated radio of claim 18, wherein the at least one primary turn further comprises:

a plurality of turns on a first one of the at least one dielectric layer; and

a plurality of metal bridges on a second one of the at least one dielectric layer, wherein the plurality of metal bridges are operably connected to the plurality of turns to provide the primary winding.

20. The integrated radio of claim 18, wherein the at least one secondary turn further comprises:

a plurality of turns on a first one of the at least one other dielectric layer; and

a plurality of metal bridges on a second one of the at least one other dielectric layer, wherein the plurality of metal bridges are operably connected to the plurality of turns to provide the secondary winding.

21. The integrated radio of claim 18 further comprises:

the primary winding including an interwoven spiral-type primary inductor; and

the secondary winding including an interwoven spiral-type secondary inductor that is substantially symmetrical to the primary winding.

22. The integrated radio of claim 21 further comprises:

the interwoven spiral-type primary inductor including a first number of multiple turns; and

the interwoven spiral-type secondary inductor including a second number of multiple turns.

23. The integrated radio of claim 18, wherein the secondary winding further comprises:

a center tap operably connected to ground to provide a differential signal at end ports of the secondary winding.

24. The integrated radio of claim 18, wherein the at least one primary turn further comprises:

at least one turn on a first one of the at least one dielectric layer;

at least one other turn on a second one of the at least one dielectric layer; and

a plurality of vias operably connecting the at least one turn on the first one of the at least one dielectric layer in parallel to the at least one other turn on the second one of the at least one dielectric layer to provide the primary winding.

25. The integrated radio of claim 18, wherein the at least one secondary turn further comprises:

at least one turn on a first one of the at least one other dielectric layer;

at least one other turn on a second one of the at least one other dielectric layer; and

a plurality of vias operably connecting the at least one turn on the first one of the at least one other dielectric layer in parallel to the at least one other turn on the second one of the at least one other dielectric layer to provide the secondary winding.

26. The integrated radio of claim 18 further comprises:

a substrate, wherein the at least one dielectric layer of the primary winding is on the substrate, wherein the at least one other dielectric layer of the secondary winding is on the substrate such that the primary winding is magnetically and capacitively coupled to the secondary winding.